REMARKS

Favorable reconsideration and allowance of the claims of the present application are respectfully requested.

In the outstanding Office Action, the Examiner has indicated that the originally filed title was non-descriptive. In response to the Examiner's request for a new title for the present application, applicants have amended the title of the invention appearing at the top of Pages 1 and 22 to read as follows: METHOD FOR ENHANCED UNI-DIRECTIONAL DIFFUSION OF METAL AND SUBSEQUENT SILICIDE FORMATION. Applicants respectfully submit that the new title provided herein is more descriptive of the claims presently being prosecuted. As such, the objection to the specification raised in the outstanding Office Action has been obviated. Reconsideration and withdrawal of the objection to the specification are thus respectfully requested.

Before addressing the various substantive grounds of rejection raised in the outstanding Office Action, applicants have amended independent Claims 1 and 15 to positively recite that the claimed first thermal cycle of the first anneal is performed at a first temperature of less than about 350°C that enhances uni-directional diffusion of a metal into a Si-containing material thereby forming an amorphous metal-containing silicide. Support for this amendment to Claims 1 and 15 is found, for example, at paragraph 39 and in original Claims 8 and 20. Since the claimed feature recited in original Claims 8 and 20 has been added to both of Claims 1 and 15, dependent Claims 8 and 20 have been cancelled herein.

Since the above amendments to the claims do not introduce any new matter into the specification of the instant application, entry thereof is respectfully requested.

In the outstanding Office Action, Claims 1-7, 9-10, 12-14, 15-19, 22 and 23-25 stand rejected under 35 U.S.C. § 102(b) as allegedly anticipated by U.S. Patent No. 6,413,859 to Cabral, Jr. et al. ("Cabral, Jr."). Claims 8, 11, 20, 21 and 23 stand rejected under 35 U.S.C. § 103 as allegedly unpatentable over the disclosure of Cabral, Jr.

With respect to the § 102(b) rejection, it is axiomatic that anticipation under § 102 requires that the prior art reference disclose each and every element of the claim to which it is applied. In re King, 801 F.2d, 1324, 1326, 231 USPQ 136, 138 (Fed. Cir. 1996). Thus, there must be no differences between the subject matter of the claim and the disclosure of the prior art reference. Stated another way, the reference must contain within its four corners adequate direction to practice the invention as claimed. The corollary of the rule is equally applicable: Absence from the applied reference of any claimed element negates anticipation. Kloster Speedsteel AB v. Crucible Inc., 793 F.2d 1565, 1571, 230 USPQ 81, 84 (Fed. Cir. 1986).

Applicants respectfully submit that the claimed methods, as recited in Claims 1-7, 9-19 and 21-25 of the present application are not anticipated by the disclosure of Cabral, Jr.

Specifically, Cabral, Jr. does not disclose a method of forming a metal silicide (including a Co disilicide) which includes, among the other recited processing steps, a step of subjecting a structure comprising a metal-containing (or Co-containing) silicon alloy layer over a Si-containing material to a ***first anneal which comprises a first thermal cycle which is performed at a first temperature of less than about 350°C that enhances uni-directional diffusion of said metal (or Co) into said Si-containing material thereby forming an amorphous metal-containing (or Co-containing) silicide*** and a second thermal cycle which is performed at a second temperature that converts the amorphous metal-containing (or Co-containing) silicide into a crystallized metal (or Co)

rich silicide that is substantially non-etchable as compared to the metal-containing (or Co-containing) silicon alloy layer.

Cabral, Jr. provides a method for fabricating a CMOS structure which includes a metal silicide contact that exhibits little or no agglomerization during a subsequent high temperature anneal that follows the contact formation. In accordance with the disclosure of Cabral, Jr. such a metal silicide contact is formed by (a) forming a metal alloy layer over a portion of a silicon-containing substrate, said metal alloy layer comprising Co or Ti and an alloying additive, said silicon-containing layer not containing activated source/drain regions embedded therein; (b) annealing said metal alloy layer at a temperature which is effective in converting a portion of said metal alloy layer into a metal alloy silicide layer that is highly resistant to etching as compared to the unreacted metal alloy layer; (c) removing any remaining metal alloy layer not converted in step (b); (d) optionally, annealing said metal alloy silicide layer produced in step (b) so as to convert the same into its lowest resistant phase; and (e) forming activated source/drain regions in said silicon-containing substrate by at least annealing at a temperature of about 900.degree. C. or above, whereby the metal alloy silicide layer formed in steps (b) or (d) does not agglomerate during said activation annealing, and is in its lowest resistance phase after said activation annealing.

In accordance with the disclosure of Cabral, Jr. a pre-anneal step that is performed at a temperature of about 350°C to 450°C prior to the main anneal that is performed at a temperature of about 400°C to about 700°C. This is disclosed, for example, at Col. 4, lines 57-66 and Col. 5, lines 3-17. An optional anneal may be performed at a temperature from about 700°C to about 900°C.

Applicants respectfully submit that nowhere in Cabral, Jr. is there mention of the claimed ***first anneal which comprises a first thermal cycle which is performed at a first temperature of less than about 350°C that enhances uni-directional diffusion of said metal (or Co) into said Si-***

containing material thereby forming an amorphous metal-containing (or Co-containing) silicide. Applicants observe that in Cabral, Jr. the anneals are performed at 350°C or above forming a specific silicide phase that has a given crystal structure. The anneals disclosed in Cabral, Jr. are not performed to ***enhance uni-directional diffusion of said metal (or Co) into a Si-containing material thereby forming an amorphous metal-containing silicide,*** as presently claimed.

The foregoing remarks clearly demonstrate that the applied reference does not teach each and every aspect of the claimed invention, as required by King and Kloster Speedsteel; therefore, the claims of the present application are not anticipated by the disclosure of Cabral, Jr. Applicants respectfully submit that the instant § 102 rejection has been obviated and withdrawal thereof is respectfully requested.

With respect to the obviousness rejection citing Cabral, Jr. applicants respectfully submit that the applied reference does not teach or suggest applicants' claimed methods as recited amended Claims 1 and 15 which include, among the other recited processing steps, a step of subjecting a structure comprising a metal-containing (or Co-containing) silicon alloy layer over a Si-containing material to a ***first anneal which comprises a first thermal cycle which is performed at a first temperature of less than about 350°C that enhances uni-directional diffusion of said metal (or Co) into said Si-containing material thereby forming an amorphous metal-containing (or Co-containing) silicide*** and a second thermal cycle which is performed at a second temperature that converts the amorphous metal-containing (or Co-containing) silicide into a crystallized metal (or Co) rich silicide that is substantially non-etchable as compared to the metal-containing (or Co-containing) silicon alloy layer.

As discussed above, Cabral, Jr. discloses a method wherein higher annealing temperatures are used in the first thermal cycle. The higher annealing temperatures recited in Cabral, Jr. do not

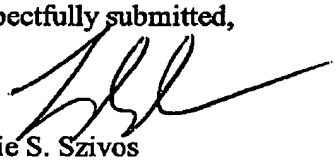
provide ***enhanced uni-directional diffusion of said metal (or Co) into a Si-containing material thereby forming an amorphous metal-containing (or Co-containing) silicide***, as presently claimed. Instead, in the prior art, the higher annealing temperatures are used to form a specific crystal phase of a silicide.

The § 103 rejection also fails because there is no motivation in the applied references which suggest modifying the disclosed methods to include the various features recited in the claims of the present invention. Thus, there is no motivation provided in the applied references, or otherwise of record, to make the modification mentioned above. "The mere fact that the prior art may be modified in the manner suggested by the Examiner does not make the modification obvious unless the prior art suggested the desirability of the modification." In re Vaeck, 947 F.2d, 488, 493, 20 USPQ 2d. 1438, 1442 (Fed.Cir. 1991).

The rejection under 35 U.S.C. § 103 citing Cabral, Jr. has been obviated; therefore reconsideration and withdrawal thereof is respectfully requested.

In view of the above amendments and remarks, it is firmly believed that the present application is in condition for allowance, which action is earnestly solicited.

Respectfully submitted,



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